

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平9-4067

(43) 公開日 平成9年(1997)1月7日

(51) Int.Cl. ⁴	識別記号	庁内整理番号	F I	技術表示箇所
E 0 4 B 1/58	5 0 6		E 0 4 B 1/58	5 0 6 F
1/24		7121-2E	1/24	Q
1/348		7121-2E	1/348	H

審査請求 未請求 請求項の数1 O L (全 3 頁)

(21) 出願番号 特願平7-154581

(22) 出願日 平成7年(1995)6月21日

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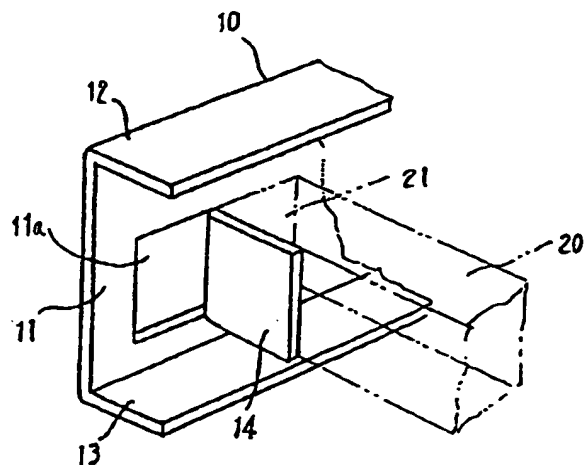
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(54) 【発明の名称】 構造材の接続部構造

(57) 【要約】

【目的】 別途の取付片が不要で、加工精度が高く、コストが軽減できる構造材の接続部構造を提供する。

【構成】 建物の構造体の一部を構成し、型鋼材10と型鋼材10にほぼ直交する構造材20とからなり、型鋼材10の側面に構造材20の端部が突き合わされて接続されるようになされた構造材の接続部構造において、上記型鋼材10の側面11に打抜きにより、側面11に対してほぼ直交方向の取付片14が側面11より曲折して設けられ、この取付片14に構造材20の端部が接続されるようになっている。



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【特許請求の範囲】

【請求項1】 建物の構造体の一部を構成し、型鋼材と型鋼材にほぼ直交する構造材とからなり、型鋼材の側面に構造材の端部が突き合わされて接続されるようになされた構造材の接続部構造において、上記型鋼材の側面に打抜きにより、側面に対してほぼ直交方向の取付片が側面より曲折して設けられ、この取付片に構造材の端部が接続されるようになされていることを特徴とする構造材の接続部構造。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、建物の構造体の一部を構成する構造材の接続部構造に関する。

【0002】

【従来の技術】 従来、建物の構造体の一部を構成するI型鋼やコ型鋼等の型鋼材の側面に、構造材の端部を直交方向より突き合わせさせて接続するようにした構造材の接続構造は、例えば、実開昭57-125803号公報や実開平2-49402号公報に記載されているように、断面形状がI字形をなす横架基材のウェブ面と直角をなす方向に接続用のスチフナ（補鋼材）を付設し、このスチフナ（補鋼材）に接続用のボルト穴等を設け、構造材を接続するようになっている。

【0003】 即ち、図4に示すように、一方のコ字形の型鋼100の内方に取付プレート200を溶接等により取付けて、この取付プレート200の先端側を外方に突出させ、この取付プレート200に他方の型鋼等の側面端部を当接させ、固着させるようになっている。

【0004】 上記のように、他の型鋼等の構造材を接続する取付片は、一般的に型鋼材のウェブ面（側面）に溶接による溶着や、ボルト・ナットによる締結により固定されて設けられた構造となっている。

【0005】

【発明が解決しようとする課題】 しかしながら、上記実開昭57-125803号公報や実開平2-49402号公報に記載されているような従来の接続構造においては、別途に取付片を製作するためのコストがかかり、又、取付片の溶接加工や大明け加工等の加工コストが高むといったことや、更には、この取付片が溶接やボルト・ナットによる取付加工であるために、取付精度にバラツキがでるといった問題があった。

【0006】 本発明は、上記のこのような問題点に着目してなされたものであり、その目的とするところは、これらの問題点を解消し、別途の取付片が不要で、加工精度が高く、コストが大幅に軽減できる構造材の接続部構造を提供するものである。

【0007】

【課題を解決するための手段】 本発明の構造材の接続部構造においては、建物の構造体の一部を構成し、型鋼材と型鋼材にほぼ直交する構造材とからなり、型鋼材の側

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面に構造材の端部が突き合わされて接続されるようになされた構造材の接続部構造において、上記型鋼材の側面に打抜きにより、側面に対してほぼ直交方向の取付片が側面より曲折して設けられ、この取付片に構造材の端部が接続されるようになされていることを特徴とする。

【0008】 上記の構造材の形状としては、木質の角材、コ字形の型鋼材等が用いられる。

【0009】

【作用】 本発明の構造材の接続部構造においては、型鋼材の側面に打抜きにより、側面に対してほぼ直交方向の取付片が側面より曲折して設けられ、この取付片に構造材の端部が接続されるようになされているので、従来のような別途の取付片が不要となり、又、加工工程の低減が図れる。

【0010】 又、加工精度が大幅に向上するので、構造体の組立精度を向上させることが可能である。

【0011】

【実施例】 以下、本発明の実施例を図面を参照して説明する。図1は、本発明の構造材の接続部構造の一例を示す斜視図である。図1において、10は、建物の構造体の一部であり、例えば、図2に示すようなユニット建物50において適応されるものである。

【0012】 10は、上記ユニット建物50の建物ユニット51の床部、或いは屋根ユニット52の小屋組等を構成する一方のコ字形の型鋼材（床梁、垂木）であり、この型鋼材10の側面（ウェブ面）11に、他方の木材等よりなる構造材20（床小梁、母屋）の端部21が直角方向より突き合わされて木ネジ等により接続されるようになされた構造材の接続部構造を示すものである。

【0013】 本発明のこの構造材の接続部構造は、例えば、型鋼材10が建物の床梁で、この床梁に対して鉛直方向に床小梁を接続するような構造や、又、軒梁や桁梁への垂木の接続等においても適用することができる。

【0014】 上記型鋼材10の側面11には、直方形の3辺が打抜きにより切断され、残る1辺が側面に対してほぼ鉛直方向に上下のフランジ12、13側に曲折された取付片14がほぼ一定間隔で形成されている。

【0015】 この取付片14に、図示のように他方の構造材20の端部21の側面が当接され、溶接による溶着や、或いはボルト・ナット等により締結されて固定されている。

【0016】 上記のようにウェブ面である側面11が、3辺（上下の水平方向と垂直方向）が打抜きにより切断され、1辺の垂直方向が曲折されることにより、側面11に欠落部11aが形成されることになるが、側面11の荷重を負担する上下方向と平行して同方向にこの曲折部が設けられているので、断面強度の低下を起すことがない。

【0017】 又、上記取付片14の鉛直方向に突き出す形状は、上記実施例のように方形の他、三角形、半円形

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等であってもよく、他方の接続される構造材の端部の形状や、必要とされる接続強度によって選定することができる。

【0018】以上のようにして型鋼材に取付片14を形成させるには、型鋼材の加工ライン上で同時に行うことができる。従って、従来のように、別途に材料を手配し、更に形状・寸法の加工を行った上で溶接や、ボルト・ナットにより締結する方法に比べて、大幅なトータルコストの低減が実現される。

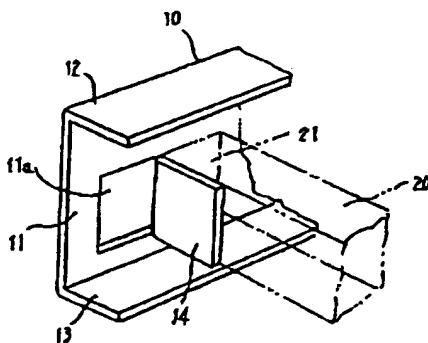
【0019】更に、この取付片14は、プレス機等を使用して加工されるので、曲折部の強度が溶接等比べて安定し、又、加工精度が大幅に向上するので、ひいては構造体の組立精度を向上させることができる。

【0020】図3は、本発明の構造材の接続部構造の他の例を示す斜視図である。図3において、30は建物の構造体の一部となるコ字形の型鋼材よりなる床梁であり、この型鋼材30の側面（ウェブ面）31に、他方の構造材である鋼材製の床小梁40の端部41が直角方向より突き合わされてボルト等により接続された例を示すものである。

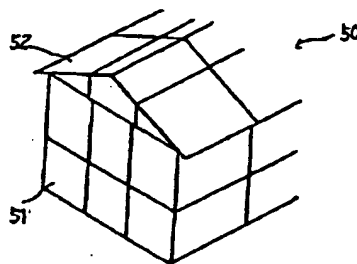
【0021】上記型鋼材30の側面31には、直方形の3辺が打抜きにより切断され、残る1辺が側面に対してほぼ直角方向に上下のフランジ32、33側に曲折された取付片34がほぼ一定間隔で形成されている。

【0022】この取付片34に、図示のように床小梁40の端部41の側面が当接され、溶接による溶着か、或いはボルト・ナット等により締結されて固定されている。

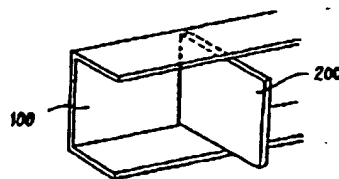
【図1】



【図2】



【図4】



【0023】

【発明の効果】本発明の構造材の接続部構造においては、型鋼材の側面に打抜きにより、側面に対してほぼ直角方向の取付片が側面より曲折して設けられ、この取付片に構造材の端部が接続されるようになされているので、従来のような別途の取付片が不要となり、又、加工工程の低減が図れる。

【0024】又、加工精度が大幅に向上するので、構造体の組立精度を向上させることが可能である。従って、構造材の接続部構造として好適である。

【図面の簡単な説明】

【図1】本発明の構造材の接続部構造の一例を示す斜視図。

【図2】ユニット建物の構成を示す斜視図。

【図3】本発明の構造材の接続部構造の他の例を示す斜視図。

【図4】従来の構造材の接続部構造を示す断面図。

【符号の説明】

10、30	型鋼材
11、31	側面（ウェブ面）
11a	欠落部
12、13、32、33	フランジ
14、34	取付片
20、40	構造材
21、41	端部
50	ユニット建物
51	建物ユニット
52	屋根ユニット



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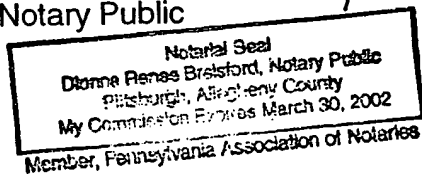
"Japanese Laid Open Patent Application No. 9-4067,
Publication Date: January 7, 1997",

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Sworn to before me this
Twenty-seventh day of July 2000

Donna Renee Bretford
Notary Public



(19) Japan Patent Office (JP)
(12) KOKAI TOKKYO KOHO (A)
(11) Laid-open Application Number: Heisei 9-4067
(43) Publication Date: January 7, 1997

(51) Int. Cl. ⁶	Id. Symbol	Office Reg. No.	F1	Techn. Ind. Field
E 04 B 1/58	506		E 04 B 1/58	506 F
E 04 B 1/24		7121-2E	E 04 B 1/24	506 Q
E 04 B 1/348		7121-2E	E 04 B 1/348	506 H

Examination Request: None

No. of Claims: 1 OL (total pages 3)

(21) Application No.: Heisei 7-154581
(22) Application Filed: June 21, 1995

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(54) [Title of the Invention] JOINT STRUCTURE OF STRUCTURAL MEMBERS

(57) [Abstract]

[Object] The object of the present invention is to provide a joint structure of structural members which requires no separate anchor member, has a high processing accuracy, and makes it possible to reduce significantly the cost.

[Structure] A joint structure of structural members, which constitutes a part of a building frame and consists of a shaped steel section 10 and a structural member 20 almost perpendicular to the shaped steel section 10 and in which the end portion of the structural member 20 is butt joined to the side surface of the shaped steel section 10, wherein an anchor member 14 which is almost perpendicular to the side surface 11 of the shaped steel section 10 is provided on the side surface 11 by punching the side surface to bend the anchor member from the side surface 11, and the end portion of the structural member 20 is joined to the anchor member 14.

[Patent Claims]

[Claim 1] A joint structure of structural members, which constitutes a part of a building frame and consists of a shaped steel section and a structural member almost perpendicular to the shaped steel section and in which the end portion of the structural member is butt joined to the side

surface of the shaped steel section, characterized by the fact that an anchor member which is almost perpendicular to the side surface of said shaped steel section is provided on the side surface by punching the side surface to bend the anchor member therefrom, and the end portion of the structural member is joined to the anchor member.

[Detailed Description of the Invention]

[0001]

[Field of Industrial Application] The present invention relates to a joint structure of structural members constituting a part of a building frame.

[0002]

[Prior Art Technology] The joint structures of structural members in which the end portion of a structural member is butt joined from a perpendicular direction to the side surface of a shaped steel section, such as an I section or a C section, constituting a portion of a building frame have been manufactured, as described in Utility Model Applications Laid-open 57-125803 and 249402, by attaching a stiffener (reinforcing steel member), which is designed for joining, in the direction perpendicular to the web surface of a lateral beam with an I-like cross section, providing bolt holes in the stiffener (reinforcing steel member) for joining, and joining the structural member.

[0003] Thus, as shown in Fig 4, an anchor plate 200 was attached, for example, by welding, to the inside of one C steel section 100 so that the front end of the anchor plate 200 protruded to the outside, and the end portion of a side surface of another steel section or the like was brought into contact with and secured to the anchor plate 200.

[0004] As described above, the anchor member designed for joining another structural member such as a steel section has usually been joined by welding to the web surface (side surface) of a shaped steel section or secured thereto by tightening with bolts and nuts.

[0005]

[Problems Addressed by the Invention] However, the conventional joint structure such as described in the above-mentioned Utility Model Applications Laid-open 57-125803 and 2-49402 had a high cost associated with a separate fabrication of anchor members. Furthermore, the cost of processing such as welding of anchors or drilling of holes was high. Moreover, since the anchor members were attached by welding or with bolts and nuts, there was a spread in attachment accuracy.

[0006] The present invention was developed based on the analysis of the above-described problems, and its object is to resolve these problems and to provide a joint structure of structural members which requires no separate anchor member, has a high processing accuracy, and makes it possible to reduce significantly the cost.

[0007]

[Means to Resolve the Problems] The present invention provides a joint structure of structural members, which constitutes a part of a building frame and consists of a shaped steel section and a structural member almost perpendicular to the shaped steel section and in which the end portion of the structural member is butt joined to the side surface of the shaped steel section, characterized by the fact that an anchor member which is almost perpendicular to the side surface of said shaped steel section is provided on the side surface by punching the side surface to bend the anchor member therefrom, and the end portion of the structural member is joined to the anchor member.

[0008] The aforesaid structural member can be a square timber bar or a C-like shaped steel section.

[0009]

[Operation] In the joint structure of structural members in accordance with the present invention, an anchor member which is almost perpendicular to the side surface of a shaped steel section is bent out from the side surface by punching the side surface, and the end portion of the structural member is joined to the anchor member. Therefore, the conventional separate anchor member is not required and the number of processing operations can be decreased.

[0010] Furthermore, since the processing accuracy is greatly increased, the frame assembly accuracy can be improved.

[0011]

[Embodiment] An embodiment of the present invention will be described below with reference to the drawings attached. Fig 1 is a perspective view illustrating an example of the joint structure of structural members in accordance with the present invention. In Fig 1, the reference symbol 10 stands for a part of a building frame which is suitable for a unit building 50 shown in Fig 2.

[0012] The reference symbol 10 stands for a C-like shaped steel section (floor beam, rafter) constituting a roof truss of a roof unit 52 or a floor of a building unit 51 of the unit building 50. An end portion 21 of another structural member 20 (small floor beam, main beam), for example, made of wood, is butt joined, for example, with wood screws, from a perpendicular direction to a side surface (web surface) 11 of the shaped steel member 10, thereby providing a joint structure of structural members.

[0013] Such a joint structure of structural members in accordance with the present invention is applicable, for example, for joining a rafter to an eaves beam or a girder beam, or for joining a small floor beam to a floor beam in the direction perpendicular thereto, when the shaped steel section 10 is the floor beam of the building.

[0014] Anchor members 14 are formed almost equidistantly in the side surface 11 of the shaped steel member 10 by cutting the three sides of a rectangle by punching and then bending the

remaining side almost perpendicular to the side surface toward the upper and lower flanges 12, 13.

[0015] As shown in the figure, the side surface of the end portion 21 of another structural member 20 is brought in contact and joined by welding or secured by tightening with bolts and nuts or the like to this anchor member 14.

[0016] As described above, since the three sides (upper and lower horizontal sides and one vertical side) were cut by punching in the side surface 11, which is the web surface, and one vertical side was bent, the opened portion 11a was formed in the side surface 11. However, since the bent portion was arranged in the same direction parallel to the vertical direction in which the side surface 11 load was applied, the cross sectional strength was not decreased.

[0017] As for the shape of the anchor member 14 protruding in the perpendicular direction, in addition to a square shape described in the aforesaid embodiment, it may be triangular, semicircular, or the like, and this shape can be selected according to the shape of the end portion of the other structural member which is to be connected, or the required joint strength.

[0018] The anchor members 14 can be formed on the shaped steel sections in the above-described manner at the same time in the section processing line. Therefore, the total cost can be significantly reduced by comparison with the process comprising the operations of separately preparing the materials, processing to the required shape and dimensions, and then welding or tightening with bolts and nuts.

[0019] Furthermore, since the anchor member 14 is obtained by using a press or the like, the strength stability of the bent portion is better than that obtained in welding or the like. Moreover, the processing accuracy is greatly increased. Therefore, the frame assembly accuracy can be increased.

[0020] Fig 3 is a perspective view illustrating another example of the joint structure of the structural member in accordance with the present invention. In the example shown in Fig 3, the reference symbol 30 stands for a floor beam consisting of a C-like shaped steel section which is a portion of a building frame. An end portion 41 of a small floor beam 40 made of steel, which is another structural member, is butt joined, for example, with bolts, from a perpendicular direction to a side surface (web surface) 31 of the shaped steel member 30.

[0021] Anchor members 34 are formed almost equidistantly in the side surface 31 of the shaped steel member 30 by cutting the three sides of a rectangle by punching and then bending the remaining side almost perpendicular to the side surface toward the upper and lower flanges 32, 33.

[0022] As shown in the figure, the side surface of the end portion 41 of the small floor member 40 is brought in contact and joined by welding or secured by tightening with bolts and nuts or the like to this anchor member 34.

[0023]

[Effect of the Invention] In the joint structure of structural members in accordance with the present invention, an anchor member which is almost perpendicular to the side surface of a shaped steel section is provided by means of bending from the side surface by punching of the side surface, and the end portion of a structural member is joined to the anchor member. Therefore, the conventional separate anchor member is not required and the number of processing operations is reduced.

[0024] Furthermore, since the processing accuracy is greatly increased, the frame assembly accuracy can be increased. Therefore, such a structure is preferred as a joint structure of structural members.

[Brief Description of the Invention]

Fig 1 is a perspective view illustrating an example of the joint structure of structural members in accordance with the present invention.

Fig 2 is a perspective view illustrating the composition of a unit building.

Fig 3 is a perspective view illustrating another example of the joint structure of structural members in accordance with the present invention.

Fig 4 is a cross sectional view illustrating the conventional joint structure of structural members.

[Legends]

- 10, 30 – shaped steel sections.
- 11, 31 – side surface (web surface)
- 11a – opened portion.
- 12, 13, 32, 33 – flanges.
- 14, 34 – anchored members.
- 20, 40 – structural members.
- 21, 41 – unit building.
- 51 – building unit.
- 52 – roof unit.

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